




## Open Archive Toulouse Archive Ouverte (OATAO)

OATAO is an open access repository that collects the work of Toulouse researchers and makes it freely available over the web where possible

This is an author's version published in: <http://oatao.univ-toulouse.fr/23261>

**Official URL:** <https://doi.org/10.1002/bbb.343>

**To cite this version:**

Vaca-Garcia, Carlos  *Industrial microalgae: do not shoot ahead!* (2011)  
Biofuels, Bioproducts and Biorefining, 5 (6). 593-594. ISSN 1932-104X

Any correspondence concerning this service should be sent  
to the repository administrator: [tech-oatao@listes-diff.inp-toulouse.fr](mailto:tech-oatao@listes-diff.inp-toulouse.fr)

# Industrial microalgae: do not shoot ahead!



**Author info:** Professor Carlos Vaca-Garcia, National Polytechnic Institute of Toulouse, France  
Coordinator of the ALGORAFFINERIE French Consortium.

**Contact:** Carlos Vaca Garcia [Carlos.VacaGarcia@ensiacet.fr]

In the present energy crisis, microalgae seem to be a new Eldorado. They can produce biofuel as they consume CO<sub>2</sub>. There is a big risk in promising too much, however, because the production of energy from microalgae has not yet been demonstrated to be economically realistic, at least in a free market. Many technological challenges still remain and there are serious doubts about the availability of algal fuel on a large scale in the next few years.

We have to be cautious about the spectacular announcements of the economical attractiveness or the potential energy yield of these cells. There are often articles in the mass media talking about miraculous solutions to the energy situation promising such unrealistic yields that even the laws of thermodynamics are blasted out. But let's remind ourselves that the photosynthetic conversion of energy can create a theoretical maximum of about 400 metric tons of biomass per hectare per year with intertropical solar radiation. In practice, it is as low as  $108 \times 10^3 \text{ kg}\cdot\text{ha}^{-1}\cdot\text{yr}^{-1}$  ( $44 \text{ ton}\cdot\text{ac}^{-1}\cdot\text{yr}^{-1}$ ) in most European countries or in the USA.

Indeed, microalgae are a new type of biomass for new industrial applications. But we also have to consider their other applications: answering to essential nutritional needs and playing the role of pre-purified feedstock for the production of active molecules aimed at drugs and cosmetics. All this comes in addition to the original energy purposes. A systemic approach to the culture and refinery of microalgae is therefore essential. This approach should integrate the production of biofuels and by-products to invest in other outlets: such as the applications

Convincing the public that the 'microalgae miracle' is right here can ultimately be detrimental to this extraordinarily promising industry

already mentioned and even new ones, such as biomaterials and organic frames for nanostructures.

We have to avoid a deadlock and avoid the difficulties we saw with the first generation of biofuels due to their competition with food resources. Convincing the public that the 'microalgae miracle' is right here can ultimately be detrimental to this extraordinarily promising industry. Let's protect it. The best of the years are yet to come.

**Carlos Vaca-Garcia**  
DOI: 10.1002/bbb.343